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वस्त्रादि — कम्बलों की ज्वलनशीलता ज्ञात करने की पद्धति

Indian Standard

TEXTILES — METHOD FOR DETERMINATION OF FLAMMABILITY OF BLANKETS

ICS 13.220.40; 97.160

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

June 2008 **Price Group 5**

Chemical Methods of Test Sectional Committee, TXD 05

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Chemical Methods of Test Sectional Committee had been approved by the Textile Division Council.

This standard is based on ASTM D 4151 : 1992 'Test method for flammability of blankets'.

This test method may also be used to evaluate electric blanket fabric, but tests should be performed on the fabric itself without the resistance heating wires inserted.

All blanket fabrics made of natural or man-made fibres or their blends are combustible. Some combustible fabrics when used are potentially dangerous to the user because of their ease of ignition, rapidity and intensity of burning. The first characteristic can be judged with the aid of the flammability.

The composition of the Committee responsible for the preparation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

TEXTILES — METHOD FOR DETERMINATION OF FLAMMABILITY OF BLANKETS

1 SCOPE

This standard specifies a method for determination of flammability of blankets and blanket fabrics in terms of their ease of ignition and propagation of flame across the surface under specified test conditions.

2 REFERENCE

The following standard contains provision which, through reference in this text, constitutes provision of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision and parties to agreement based on this standard is encouraged to investigate the possibility of applying the most recent edition of the standard indicated below:

IS No.	*Title*
11871 : 1986	Methods for determination of flammability and flame resistance of textile fabrics

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Blanket — An unquilted fabric covering designed primarily to provide thermal insulation.

NOTES

1 Blankets may be made by any textile process from various types of fibers and may or may not have raised fiber surface. Construction may be woven, flocked, or non-woven.

2 Electric blankets include resistance heating wires and can provide heat as well as thermal insulation.

3.2 Flammability — Those characteristics of a material that pertain to its relative ease of ignition and relative ability to sustain combustion.

NOTE — In this test, evidence of ignition is shown by discolouration, charring, or burning of the paper monitor.

3.3 Ignition — Initiation of combustion.

4 PRINCIPLE

4.1 Specimens cut from the blanket fabric are prepared by brushing if they have a raised fiber surface and by drying. The dried specimen is held in a special apparatus, a standardized flame is applied to the surface for a specified time under controlled conditions, and burning, charring, or discolouration of a paper monitor is noted. Two classes of flammability are described.

4.1.1 A burn of sufficient intensity to discolour a paper monitor in specified contact with the surface of specimen indicates ignition of the blanket surface (*see* **9.4**).

5 APPARATUS AND MATERIALS

5.1 Flammability Tester — Flammability tester as shown in Fig. 1 to 4 (*see also* IS 11871, Method B).

5.1.1 The test cabinet shall be equipped with a system to control the time of flame application on the specimen to 1 ± 0.05 s.

NOTES

1 A suitable system to control the time of flame application adjustable electronic timer controlling a burner solenoid to activate the burner mechanism. Alternatively, electronic counter (digital clock reading to 0.01 s) started by a switch that is activated by the burner mechanism when the burner is in the position to apply flame on the specimen and is stopped when the burner retracts from the specimen.

2 Flammability tester made for use in IS 11871 has to be modified when used with this method by changing the burner, specimen holder, and timing mechanism.

5.2 Specimen Holder and Base — The base shall be mounted on the floor of the cabinet approximately central on both axes. The position of the base shall be adjustable along both the length and width axes of the flammability test cabinet. (*see* Fig. 5 and 6).

5.3 Burner — The burner is a No. 18 hypodermic needle. The needle is cut off below the ferrule approximately 1.5 mm. One end of a copper tube approximately 200 mm long and of 3 mm outside diameter is soldered or cemented with epoxy adhesive into the ferrule of the hypodermic needle. The other end is soldered to the gas feeding tube which is part of the mechanism used to apply the flame on the specimen (*see* Fig. 1 to 7).

5.4 Butane or Prepare Gas, Commercial Grade

5.4.1 The gas line to the burner shall be equipped with a needle valve to control the flame length.

5.4.2 Gas shall be supplied to the burner at a pressure of 17.2 ± 3.4 kPa at the needle valve inlet.

5.5 Brushing Device, as shown in Fig. 8 and described in **7.3.2** of IS 11871, except that the brush rests on the carriage vertically with a pressure of 75 ± 10 g instead of 150 g.

5.6 Laboratory Drying Oven, forced draft.

5.7 Desiccator(s), of sufficient size to hold five mounted specimens at one time.

5.8 Silica Gel Desiccant, indicating type.

6 PREPARATION OF SPECIMENS AND PAPER MONITOR

6.1 Cutting Specimens

Ten specimens, each measuring 70 mm × 70 mm, shall be randomly selected from each swatch or end-use item in the laboratory sample. No specimen shall be taken nearer to the selvages or fabric edges that 1/10 of the width of the sample.

6.1.1 Carefully note the face or back side of the fabric.

6.2 Cutting Paper Monitor

Ten paper monitors, each measuring 75 mm × 90 mm with hole punches as shown in Fig. 4, except that the large centre hole shall be 50 mm in diameter instead of 65 mm as cut in the specimen holder plate.

6.3 Brushing

Each specimen having a raised fiber surface shall be brushed once against the lay of the surface fibers with the brushing device shown in Fig. 8. Other specimens do not require brushing.

6.4 Specimen Mounting

After brushing, mount each specimen in a specimen holder. Avoid handling the specimens except on the edges. Mount the specimen and paper monitor in the following order:

a) Bottom plate;
b) Specimen with surface to be tested facing upward;
c) Paper monitor, placed with the two small holes fitting over the guide pins on the bottom plate of the specimen holder; and
d) Top plate which should set the larger circular hole in the paper concentric with the hole in the top plate.

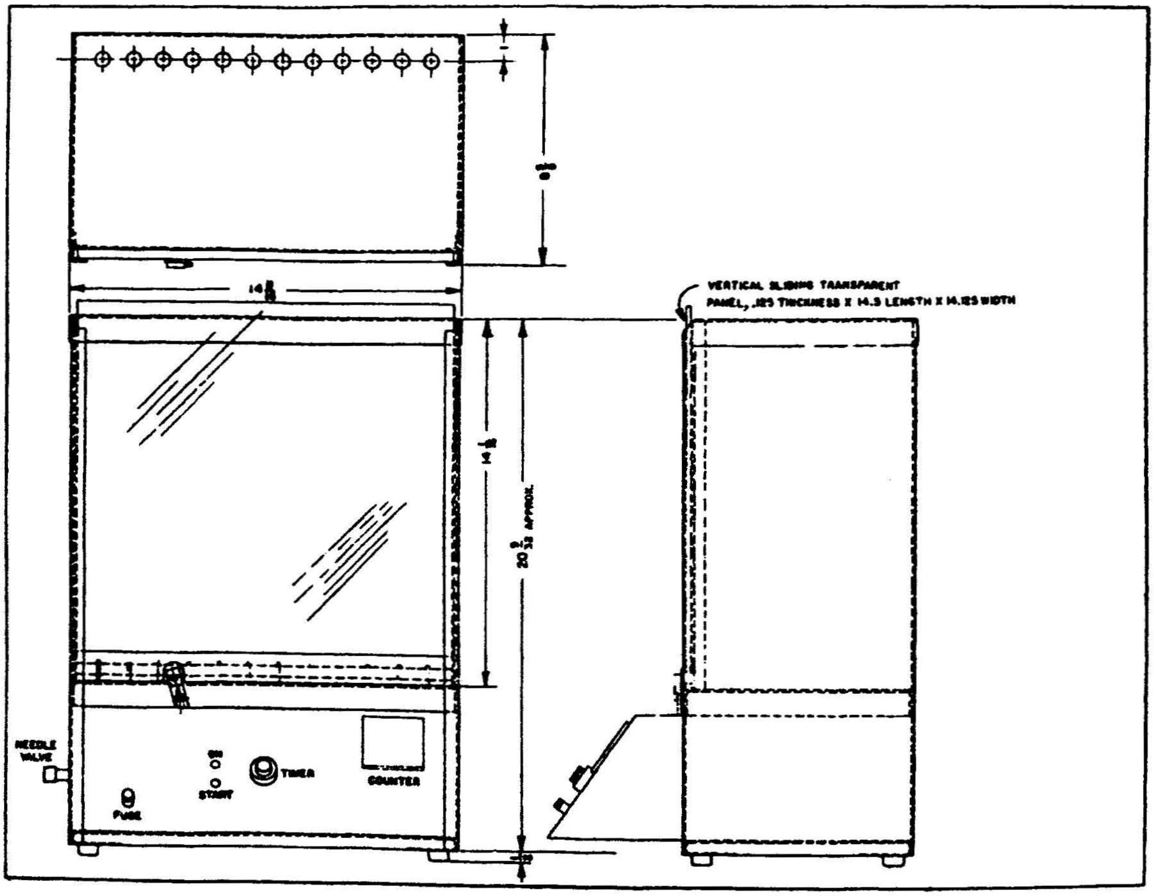
1
14
VERTICAL SLIDING TRANSPARENT PANEL, .125 THICKNESS X 14.3 LENGTH X 14.125 WIDTH
14
20 APPROX.
NEEDLE VALVE
ON
START
TIMER
COUNTER
FUSE

Fig. 1 Flammability Tester

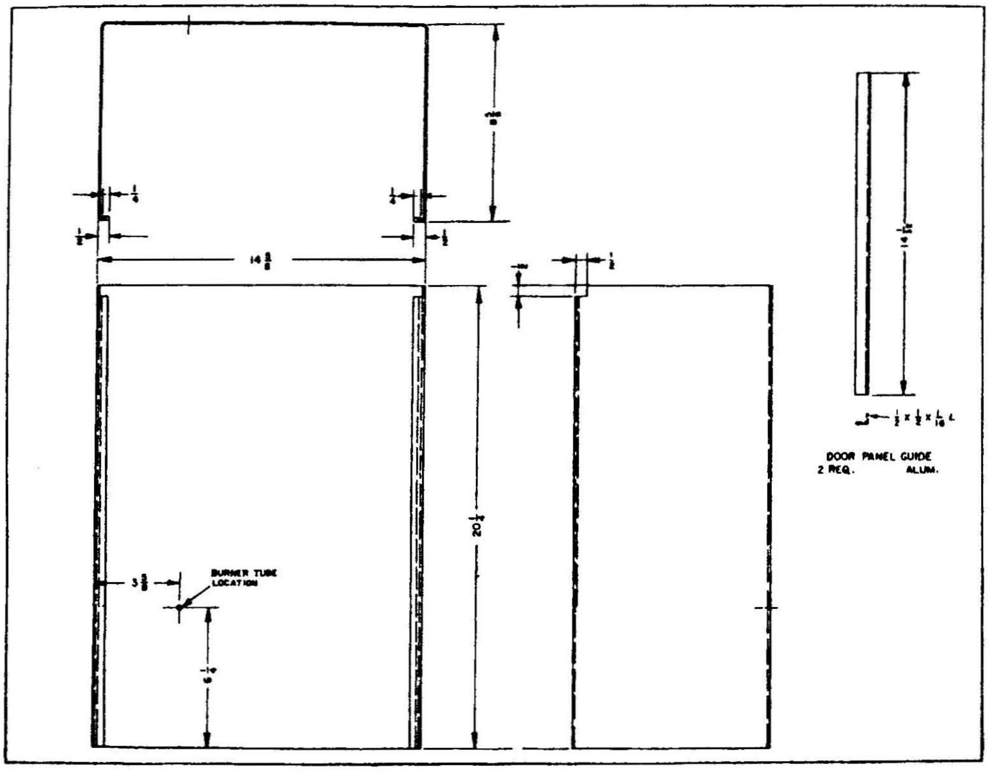

FIG. 2 FLAMMABILITY TESTER (CABINET DETAILS)

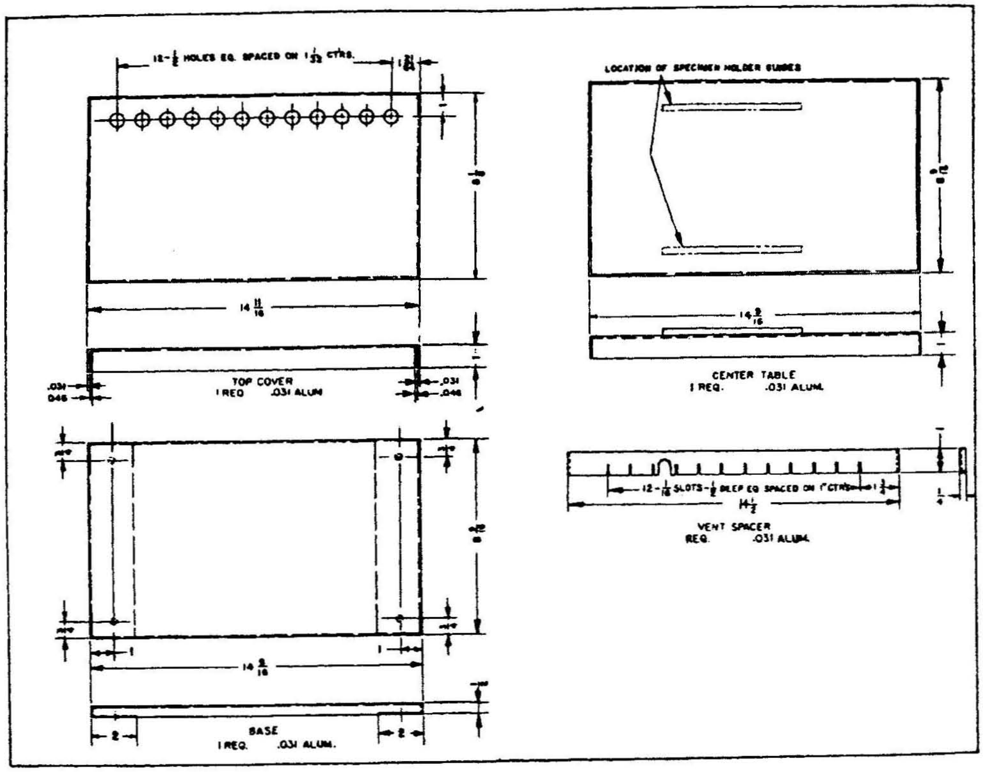

FIG. 3 FLAMMABILITY TESTER (ADDITIONAL CABINET DETAILS)

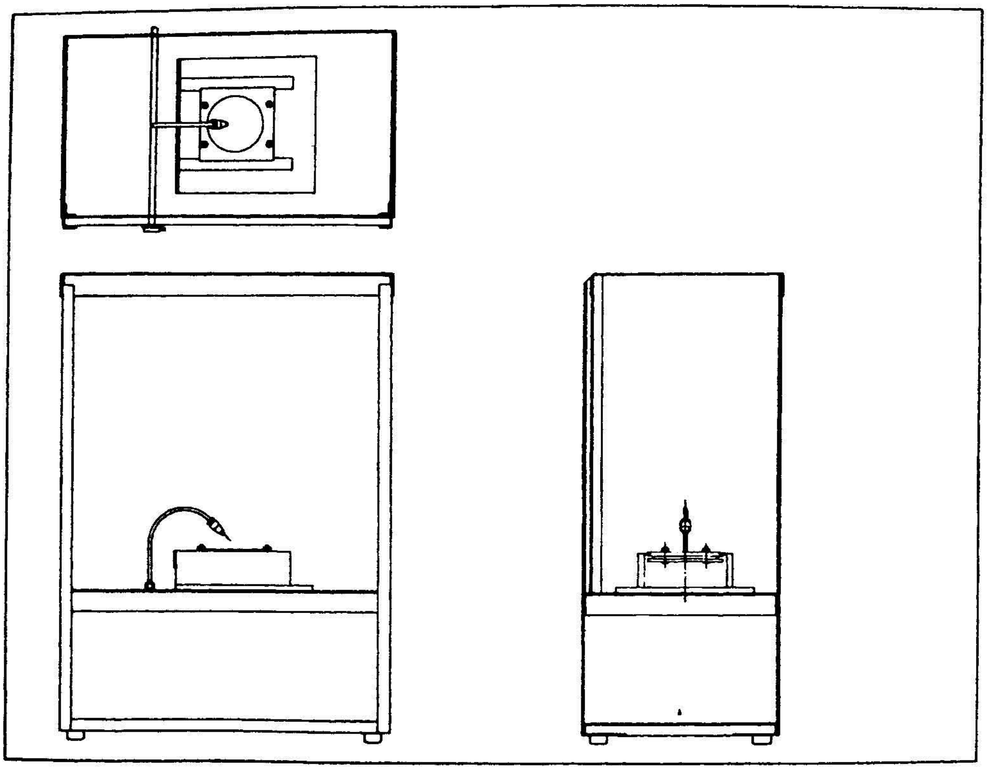

FIG. 4 FLAMMABILITY TESTER ARRANGEMENT

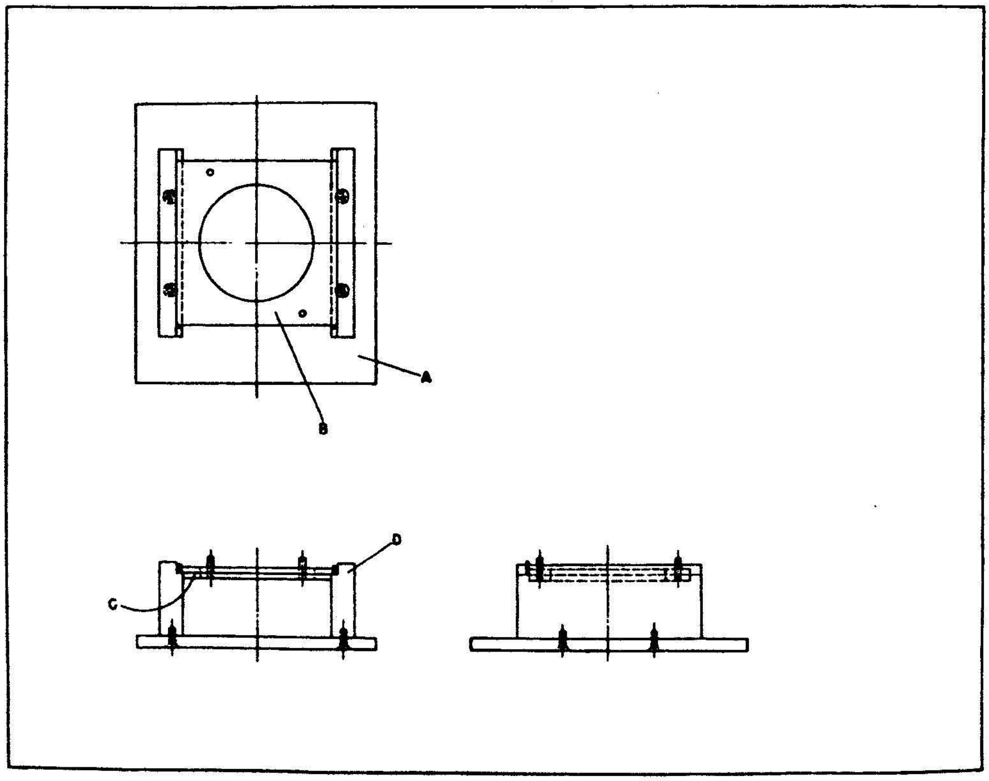

FIG. 5 SPECIMEN HOLDER ASSEMBLY

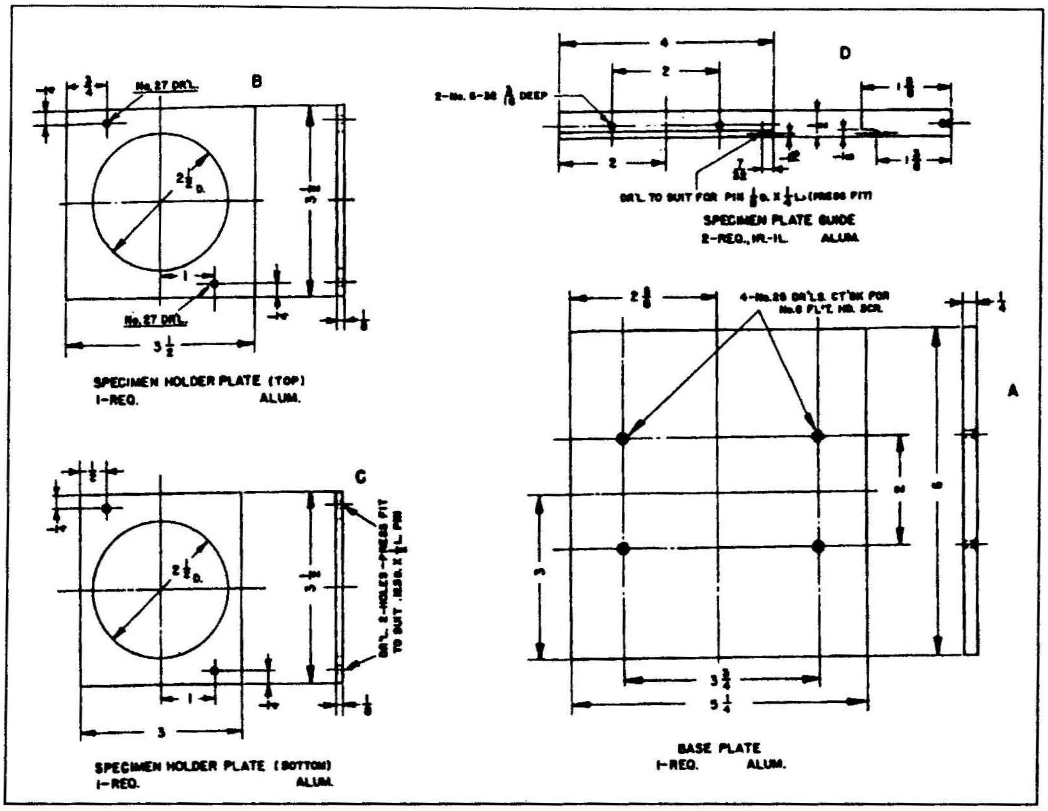
No. 27 DR'L.
B
3 1/2
SPECIMEN HOLDER PLATE (TOP)
1-REQ. ALUM.
C
2 1/2 D.
DR'L. 2-HOLES-PRESS FIT TO SUIT .1250 X 1/4 L. PIN
3
SPECIMEN HOLDER PLATE (BOTTOM)
1-REQ. ALUM.
D
4
2
2-No. 6-32 3/16 DEEP
1 3/8
DR'L. TO SUIT FOR PIN 1/8 D. X 1/4 L. (PRESS FIT)
SPECIMEN PLATE GUIDE
2-REQ., RL-LL. ALUM.
2 5/8
4-No. 28 DR'LS. CT'SK FOR No. 6 FL'T. HD. SCR.
1/4
A
6
3
3 3/4
5 1/4
BASE PLATE
1-REQ. ALUM.

FIG. 6 SPECIMEN HOLDER DETAILS

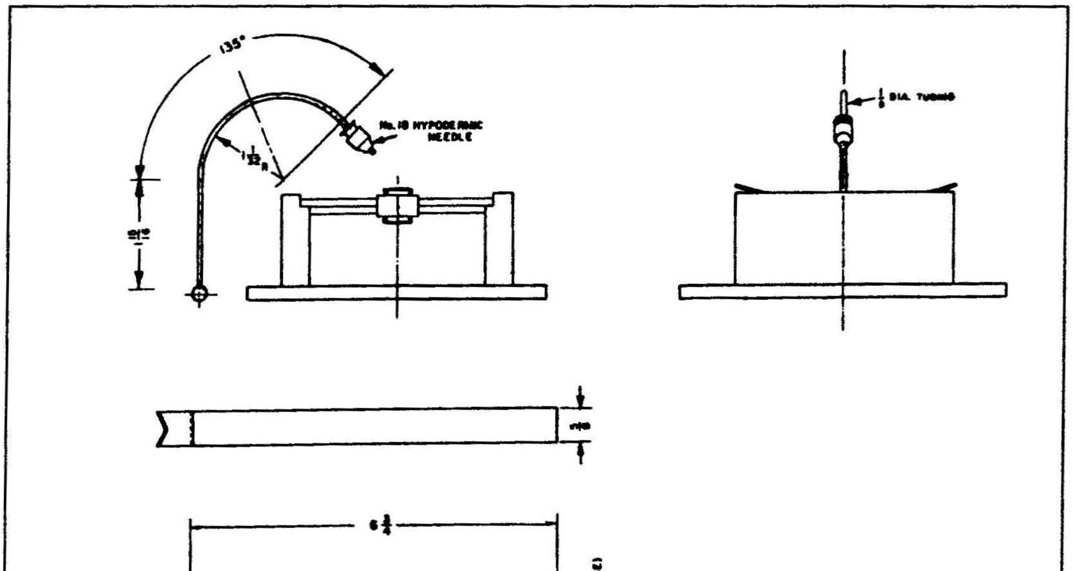

FIG. 7 BURNER DETAILS

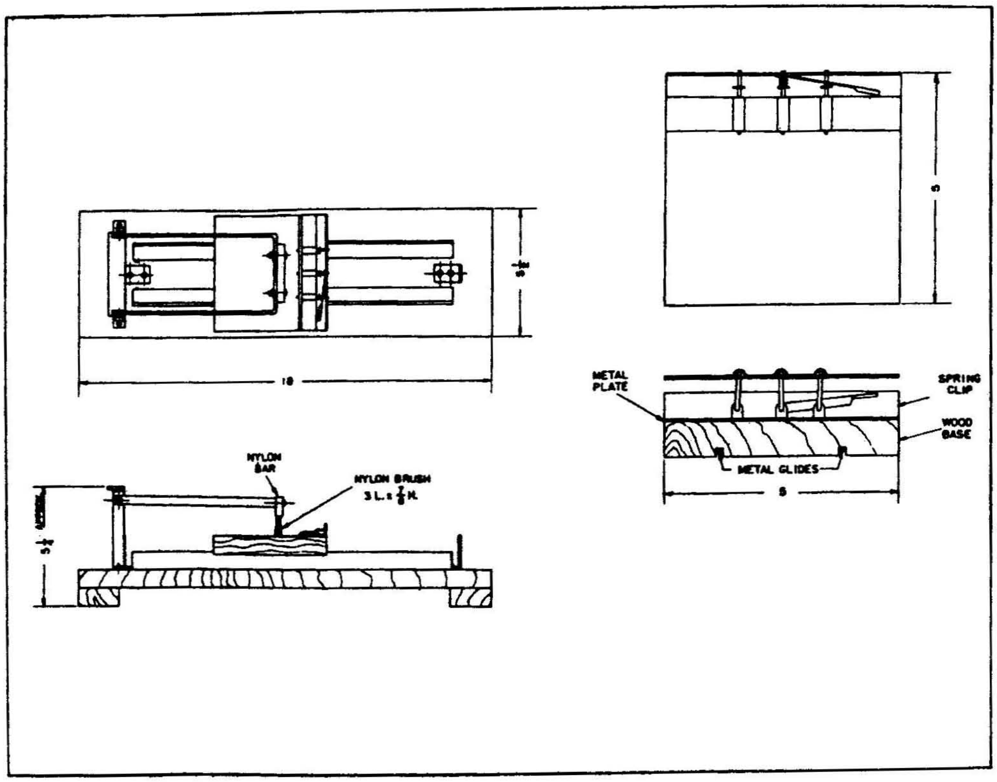

FIG. 8 BRUSHING DEVICE

7 PREPARATION OF APPARATUS

7.1 Adjustment

7.1.1 Adjust the burner in the actuated position (*see* Fig. 9) so the burner tip is 8 mm from the specimen surface. A burner height gauge clamped in the specimen holder (*see* Fig. 7) may be used for this adjustment. With the burner in the actuated position, move the base and holder assembly away from the burner tube so that the burner tip is 3.2 mm off the center. Secure holder assembly to the cabinet floor.

7.1.2 Adjust the timer so that the burner, when actuated, remains in position. Apply the flame to the specimen for an average time of 1 ± 0.05 s. This is accomplished by actuating the burner mechanism, reading the time on the counter, and adjusting as necessary.

7.1.3 Adjust the flame length with the hood fan turned off and the burner in the retracted position. Use the needle valve to adjust the flame length to 16 mm from the tip of the burner, measuring only the clearly visible yellow portion of the flame. A suitable gauge for this adjustment is shown in Fig. 7. The gauge is held at a right angles to the burner axis.

NOTE — It is necessary to allow gas to flow through the burner for up to 5 min to purge all air from the system before attempting to adjust the flame length.

8 CONDITIONING

8.1 Dry the mounted specimens in a horizontal position in a forced draft oven at 105 ± 3°C for 30 min, remove from the oven, and place over an indicating desiccant such as silica gel for not less than 30 min not more than 60 min.

8.1.1 Ensure that the brushed surface of each specimen is not touched or disturbed.

8.1.2 Do not place more than five specimens in the desiccator at one time.

9 PROCEDURE

9.1 After preparing the apparatus, remove a mounted specimen from the desiccator and place it in position on the rack in the chamber of the apparatus. Expose the specimen to the flame within 30 s of the time it is removed from the desiccator.

9.2 Close the door of the apparatus. Set the timer at

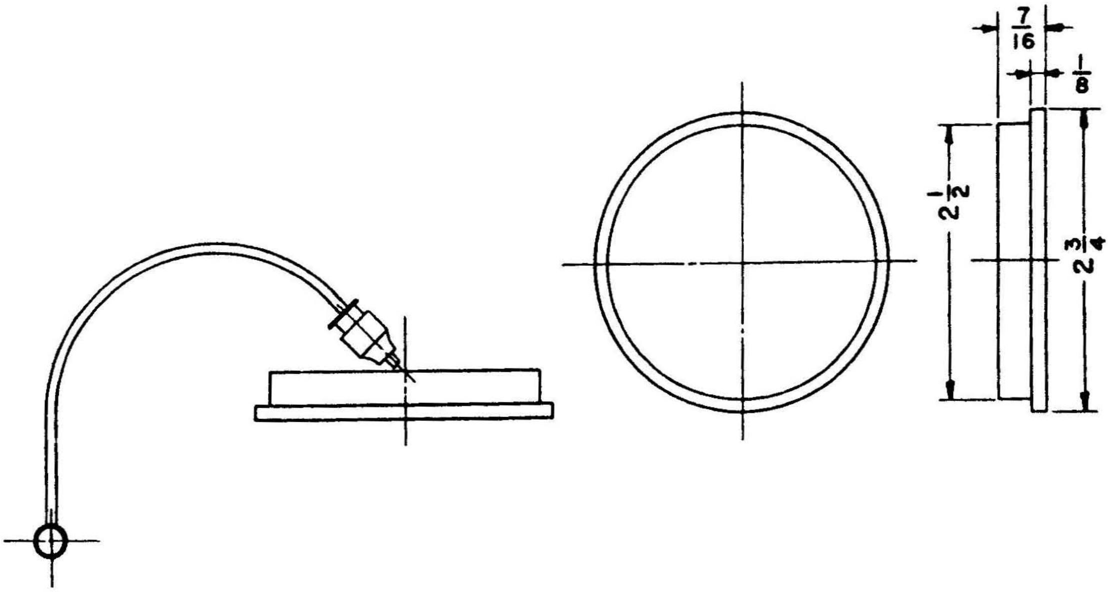

FIG. 9 SETTING BURNER POSITION

zero. Conduct the test in a draft-free room with the apparatus at room temperature.

9.3 Activate the timing mechanism to apply the flame to the specimen for a period of 1 ± 0.05 s.

9.4 When the burner combustion has stopped, as evidenced by the absence of flame and afterglow, remove the specimen from the cabinet, place it on a flat surface and determine whether or not ignition has occurred.

9.4.1 Ignition is considered to have occurred if the paper monitor is burned, charred, or discoloured at any point.

9.5 Test ten specimens, five on the face side and five on the back side for each laboratory sample unit.

10 INTERPRETATION OF RESULTS

10.1 In order to place blanket fabrics in one or any of the two classes of flammability, a decision is made on whether or not a paper monitor bums, chars, or discolours as described in **9.4**. It must be understood, however, that no guarntee can be given and none is implied that a blanket fabric or product falling into either of the two classes will or will not be hazardous under some conditions of use.

10.2 The two classes are as follows:

a) *Class I* — If none of the paper monitors burns, chars, or becomes discoloured after exposing the specimens to the ignition source, the material is classified as Class I. Class I textiles are generally considered by the trade as having non usual burning characteristics and are acceptable for use in manufacturing blankets.

b) *Class II* — If one or more of the paper monitor burn, char, or become discoloured after exposing the specimens to ignition source, the material is classified as Class II. Class II textiles are considered to be sufficiently flammable that they are recognized by the trade as being unsuitable for blanket manufacture.

11 REPORT

Report the following information:

a) Number of ignitions causing the paper monitor to burn, char, or discolour, and

b) Classification of each specimen.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Chemical Methods of Test Sectional Committee, TXD 05

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